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ABSTRACT

The study reported here was an attempt to systematically manipulate certain factors which might be responsible for the poor communicational performance of lower socioeconomic status children. The major questions raised were: Can differences in task difficulty, perceptual characteristics of the task, and task instructions attenuate or eliminate observed SES differences? These three task variables are concerned with the information processing demand characteristics of the communication task. This study attempted to determine whether the problems encountered by the lower SES child in a referential communication task were communication problems or whether these problems could be attributed to information processing difficulties. This study utilized a simple referential description task in order to explore the possible effects of information processing factors on the speaker's communicational performance. If interactions were to be observed between the three above mentioned classes of task variables and the SES of the speaker, this might indicate that the problems encountered by the lower SES speaker were caused by information processing difficulties. Seventy-two fourth grade male and female white students (half lower SES and half middle SES), who had achieved normal age-grade placement, served as subjects in the study. (Author/JM)

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SOCIAL-CLASS AND THE DESCRIPTION OF VISUAL ARRAYS

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Abstract

Recent studies have indicated that lower SES children perform more poorly on referential communication tasks than middle SES children do. The present study attempted to determine whether the manipulation of certain information processing factors could attenuate the observed SES differences. White fourth grade boys and girls were used as subjects. Communication materials were patterned after those used by Baldwin et al. (1971), and a discrimination paradigm communication task was used. Middle SES children were responded to more efficiently, however, the information processing variables that were manipulated did not attenuate or eliminate the observed SES differences. A possible explanation for the observed middle SES superiority concerns the manner in which middle SES speakers chunked the relevant information in their messages.

Acknowledgement

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SOCIAL-CLASS AND THE DESCRIPTION OF VISUAL ARRAYS

Jay Pozner

What conclusions can be reached after reviewing the results of previous studies on SES differences in children's referential communication skills? In a recent review of this area Glucksberg et al. (1974, p. 38) concluded: "If there are differences among SES groups in communication skills, they have not been clearly demonstrated. If such differences were to be found, we would not know what they meant." The author of the present paper disagrees with the latter statement.

Krauss and Rotter (1968), Heider (1971), Baldwin, McFarlane, and Garvey (1971), Pozner (1971), and Pozner and Saltz (1974) have all demonstrated that lower SES children perform more poorly on referential communication tasks than middle SES children do.

Although consistent SES differences in referential communication abilities have been observed, the explanations for these differences have varied. Baldwin, McFarlane and Garvey (1971) as well as Heider (1971) have demonstrated that SES differences in total verbal output cannot adequately explain the observed SES differences in communicational abilities. Pozner and Saltz (1974) and Baldwin, McFarlane and Garvey (1971) have also demonstrated that SES differences in intelligence cannot account for the observed SES differences in referential communication abilities. However,

going beyond these observations, many explanations have been offered for the poor communicational performance of lower SES children. Pozner and Saltz (1974) suggest that inadequately developed role taking skills and an egocentric approach to the communication task may be responsible for the poor performance of lower SES children, as speakers. Further, in studies where SES differences in vocabulary have not been eliminated, inadequate vocabulary may also be a factor in the observed SES differences. This factor would probably affect both speakers and listeners. Finally, in studies where abstract stimuli are used or where the listener is faced with stimuli which are not highly discriminable from one another, problems of a perceptual nature might lead to poor performance in the lower SES group.

The present study was an attempt to systematically manipulate certain factors which might be responsible for the poor communicational performance of lower SES children. The major questions raised were: Can differences in task difficulty, perceptual characteristics of the task, and task instructions attenuate or eliminate observed SES differences? These three task variables are concerned with the information processing demand characteristics of the communication task. This study attempted to determine whether the problems encountered by the lower SES child in a referential communication task were communication problems or whether these

problems could be attributed to information processing difficulties (i.e., problems occurring before the verbalization phase of communication). In a previous study conducted by Pozner and Saltz (1974), it was demonstrated that lower SES speakers have communicational difficulties even when it has been demonstrated that they understand the content of the communicational problem.

However, most of the studies on SES differences in referential skills have utilized simple description tasks in which there was no direct way to determine whether the speaker was attending to the relevant aspects of the task. In these tasks the lower SES speaker may have had information processing difficulties. Factors such as the perceptual characteristics of the task (Krauss and Weinheimer, 1967) and the amount of attention that the child gave to the stimuli (Sigel and Olmsted, 1970) could have influenced his performance on the task.

The present study utilized a simple referential description task in order to explore the possible effects of information processing factors on the speaker's communicational performance. If interactions were to be observed between the three above mentioned classes of task variables and the SES of the speaker, this might indicate that the problems encountered by the lower SES speaker were caused by information processing difficulties.

Method

Subjects

Seventy-two fourth grade male and female white students (half lower SES and half middle SES), who had achieved normal age-grade placement, served as subjects in the study. Students were selected from the Kettering and Jefferson Elementary Schools in the Wayne-Westland, Michigan School District. Within each SES grouping half the subjects were male and half were female.

The parental occupation scale of social status developed by Brent (1967) was used to assign subjects to lower and middle SES groups. A listing of all the different parental occupations in the sample was made, and three faculty members in the Department of Psychology at Wayne State University were asked to assign all parental occupations to a middle or lower grouping on the basis of the Brent criteria: Middle occupations are those occupations in which symbolic, and primarily abstracting, cognitive operations are required. Lower status occupations are those jobs in which the primary ingredient is object manipulation. These jobs tend to require a minimum degree of symbolic manipulation. An inter-rater percentage of agreement of 88% was achieved by using this method. The raters disagreed on six out of a total of fifty occupational categories. The above mentioned procedures for determining social class were also compared to

the Warner, Meeker, and Eels (1960) seven point revised scale of social status. Only subjects who were classified at or above level four were assigned to the middle SES grouping, and only subjects who were classified at or below level three were assigned to the lower SES grouping. In no instance was there a disagreement between the Brent ratings and the Warner et al. scale. Subjects upon whom the raters were in disagreement were eliminated from the study.

The Warner et al. scale assigns low numbers to the higher rated occupations. The lowest rating is a one and the highest is a seven. The lower SES speakers in the sample had a mean rating of 6.3 on the Warner et al. scale and a range of between six and seven points. The lower SES listeners had a mean rating of 6.3 and a range of between five and seven points. The middle SES speakers had a mean rating of 2.75 and a range of between one and four points. The middle SES listeners had a mean rating of 2.66 and a range of between one a four points. Within each of the SES groups, twelve subjects were randomly selected to serve as speakers and the other twelve subjects served as listeners. Of the twelve speakers within each SES group, six were randomly assigned to the attention instructions condition, (three boys and three girls) and six were randomly assigned to a regular instructions condition (three boys and three girls). Six pairs consisting of a lower and middle SES listener were randomly assigned to listen to the middle

and low SES speakers in each of the instruction conditions. Each speaker in each instruction condition had a matched pair of listeners -- a middle and lower SES listener.

Experimental Tasks

A standard dyadic communication paradigm with the following exceptions was utilized: 1) The listener was not physically present when the speaker recorded a message. 2) The speaker and the listner shared the same visual context. Stimulus materials were patterned after those used by Baldwin et al. (1971). Each stimulus matrix consisted of nine figures (a target and eight distractor stimuli). The figures were printed on pieces of hard cardboard and their positions were randomly varied on a plywood display board. There were four such matrices (two consisting of bird-type figures and two consisting of non-bird animal-like figures). In each matrix the target stimulus was always a different bird-type figure. The stimulus figures in each bird and animal matrix differed along six attribute dimensions each having two values (e.g., type of hat -- crown or beret; color -- red or blue). In each matrix, two of the distractor stimuli differed on one dimension from the target stimulus, two distractor stimuli differed on two dimensions from the target stimulus, two distractor stimuli differed on three dimensions from the target stimulus, and two distractor stimuli differed on four dimensions from the target stimulus. Also, within

each of the matrix types (bird matrices vs. animal matrices) there was a two dimensional and a four dimensional matrix. With the two dimensional matrix the speaker only had to mention some combination of at least two attributes in order for the listener to select the target stimulus. If the speaker mentioned two criterial attributes, the listener could eliminate all the distractor stimuli and select the target stimulus. With the four dimensional matrix the speaker had to mention some combination of at least four attributes for the listener to logically specify the target stimulus. There was one more difference between the two dimensional and the four dimensional matrices. In the two dimensional matrices the target stimulus and one of the distractor stimuli had wings drawn on them. This addition was made in order to allow the speaker a greater number of ways to specify the target stimulus by using a two dimensional description.

Once the experiment actually began, a small, quiet, lighted conference room was used. All children participated in the experiment at approximately the same time of day. Subjects were brought into the experimental room and seated at a small table opposite a Raggedy Ann doll and to the left of the experimenter. The task was introduced with the following instructions:

> "This is Raggedy Ann (Andy). Let's pretend he's another boy (girl) your age that you are going to play a game with. The game is called: 'Do you know what I see?' Here is how we play the game. I'm going to put a blindfold on Andy so that he can't see. (The experimenter then placed a white handkerchief over the doll's eyes.) Then I'm going to show you nine things. Then I'm going to point to one of them. I want you to tell Andy everything you can about that one so that Andy will be able to pick out the one you are looking at."

In addition to these instructions the group of speakers who received special attention instructions were told the following:

> "But first take a good look at the things in the other eight boxes before you tell Andy about the one I'm pointing at."

The remainder of the instructions were identical for both groups:

> "There are two rules though. 1) You can't tell Andy which box the thing is in (e.g., If it's in the middle box you can't tell Andy it's in the middle box -- because Andy will see these things in a different arrangement and they will all be in different boxes.) 2) The second rule is that you can't say the name of the thing because then Andy would know what it is before he looks. Do you want to ask me anything before we begin? (pause) All right -- let's look at the first thing."

Each subject looked at four different arrays. The target stimulus was randomly positioned within each array for each speaker. The positioning of distractor stimuli was randomly varied, and the order of presentation of the stimulus arrays was also randomized. As the experimenter

presented each array and its target stimulus to the subject, the experimenter said:

> "Good. Now tell Andy all about it so he will be able to pick out the thing you are looking at. But remember, don't say its name."

The descriptions of all speakers were recorded on tape for later scoring and for playback to the listeners. When the subject indicated that he was through with his description of one target stimulus, the experimenter removed the matrix and presented the next matrix, saying, "O.K., now let's try another one."

Listeners in the experiment were also tested in the same conference room. The following instructions were given to listeners:

> "I am going to let you listen to someone describing some things. I want you to point to the thing you think is being described. (The experimenter held a matrix.) Wait until you have heard everything before you point to the thing that is being described."

The experimenter gave each listener practice on this task with some simple descriptions of an apple, a dog, and a fire engine. Listeners' responses were observed and recorded. Adult raters also listened to the descriptions given by child speakers and these raters assigned information transmission ratings (I-T). These are indices that were developed by Kingsley (1971). The ratings indicate the number of non-target stimuli which an adult could logically eliminate

after listening to a speaker's description. If the listener rejected the target stimulus or if he failed to reject any of the stimuli, an information transmission rating of zero was assigned. Three adults with post-graduate degrees assigned the ratings. These adults were asked to eliminate all of the stimulus figures that they could on the basis of listening to a particular description. They were cautioned against guessing, and all their ratings were performed blind. An inter-rater reliability coefficient of .78 was recorded for the raters' responses to lower SES children, and an inter-rater reliability coefficient of .88 was recorded for the adult raters' responses to middle SES children.

Results

The most notable aspect of the results of this experiment was that middle SES speakers were responded to more accurately and that the three major sets of task variables that were manipulated did not produce any consistent pattern of significant interactions with the SES of the speaker. Apparently, the problems encountered by the lower SES speaker are not caused by information processing difficulties. The following analyses reflect the scope of these problems.

There were three primary dependent variable response measures in the experiment. These were: 1) number of correct selections made by child listeners, 2) information transmission ratings assigned to the child speakers by adult raters, and 3) message adequacy scores assigned to the speakers.

In the analysis of the number of correct selections made by child listeners the data from middle and lower SES listeners were combined because no significant listener effects were observed on any matrix or on all the matrices combined. An analysis of variance was performed on this data (see Table 1). One significant effect observed in this analysis was

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Insert Table 1 about here
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attributable to the social class of speaker factor (F = 9.00, df = 1/16, $p < .01$). A mean number of .91 correct selections were made in response to each description given by lower SES speakers. A mean number of 1.41 correct selections were made in response to each description given by middle SES speakers. There were also significant differences in the listeners' responses to the two dimensional and the four dimensional matrices (F = 28.17, df = 1/16, $p < .01$). A mean number of 1.54 correct selections were made in response to the descriptions of two dimensional matrices, and a mean number of .79 correct selections were made in response to the descriptions of four dimensional matrices.

Information transmission ratings were also analyzed. Ratings assigned by the three raters were averaged and a repeated measures analysis of variance was performed on these data (see Table 2). A significant effect was obtained for

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Insert Table 2 about here
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the social class of speaker (F = 11.98, df = 1/16, $p < .01$). The mean information transmission rating given to middle SES speakers was 7.2. The mean rating given to lower SES speakers was 5.6. A significant effect was also obtained for the difficulty factor (F = 17.45, df = 1/16, $p < .01$). The mean information transmission rating assigned for descriptions of difficult matrices was 5.6, and the mean rating assigned for descriptions of easy matrices was 7.2. A significant four-way interaction was also obtained (Social Class x Sex x Concept Type "bird vs. animal" x Difficulty; F = 4.62, df = 1/16, $p < .05$).

Finally, an analysis of variance was performed on message adequacy scores (see Table 3). These scores indicate the

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Insert Table 3 about here

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number of perfect information transmission ratings assigned to a speaker. Since three raters evaluated each speaker, the maximum message adequacy score that a speaker could receive on any matrix was three. In this analysis a significant main effect was observed for the social class of speaker factor (F = 14.13, df = 1/16, $p < .01$). A mean message adequacy score of 2.02 was assigned to middle SES speakers, and a mean message adequacy score of 1.10 was assigned to lower SES speakers. A significant main effect was also obtained for the difficulty factor (F = 35.93, df = 1/16, $p < .01$). A mean message

adequacy score of 2.21 was observed on the easy matrices, and a mean message adequacy score of .92 was observed on the difficult matrices. A significant interaction was obtained between the social class of the speaker and the sex of the speaker ($F = 5.72$, $df = 1/16$, $p < .05$). This interaction seems to be accounted for by the fact that the greatest social class differences in message adequacy scores occurred between middle SES females (mean = 2.25) and lower SES females (mean = .75). A significant interaction was obtained between the social class of the speaker and the instruction condition of the speaker ($F = 4.93$, $df = 1/16$, $p < .05$). This interaction is accounted for by the fact that middle SES speakers had better message adequacy scores in the attention instructions condition (mean = 2.25) than in the regular instructions condition (mean = 1.79), whereas the lower SES speakers had better message adequacy scores in the regular instructions condition (mean = 1.41) than in the attention instructions condition (mean = .79). In the analysis of message adequacy scores a significant three-way interaction was obtained between the social class, sex, and instruction condition of speaker factors ($F = 6.57$, $df = 1/16$, $p < .05$). This interaction could be accounted for by the fact that the lower SES males performed better under the regular instructions than under the attention instructions condition while the middle SES males performed better under the attention

instructions than under the regular instructions (see Figure 1).

Insert Figure 1 about here

In an attempt to understand the nature of the SES differences between speakers, data were collected on the total number of words used per message and on the number of attribute repetitions per message (message redundancy). Middle SES speakers had a significantly greater amount of total verbal output and of message redundancy.

Also, middle and lower SES speakers were equated on the amount of relevant information that they put into their messages. The author decided to perform such an analysis comparing middle and lower SES speakers whose messages were logically adequate. When this was done, it was found that middle SES speakers were responded to correctly 89% of the time while lower SES speakers were responded to correctly 60% of the time. In these protocols, although middle and lower SES speakers used the same amount of relevant and irrelevant information, the lower SES speakers did not chunk the relevant information in the same way that middle SES speakers did. The lower SES speakers tended to separate their relevant descriptions with long intervening irrelevant statements, thus making the listeners' information processing task more difficult.

Discussion

The present research shows that lower SES children do not communicate as effectively as middle SES children. Again, as in previous studies, the differences were due to difficulties in transmission of information. There were no SES differences in comprehension of messages.

The research suggests some factors that may account for the differences in communication, and some that appear not to account for such differences. Let us start with those that do not account for the differences.

1) General intelligence does not appear to account for the observed differences. The lower and middle SES children in the present study were approximately equal I.Q. as measured by the Otis Lennon Test (96 and 97.2 respectively).

2) Ability to process information did not appear to be a factor that could account for the observed SES differences. If the lower SES children had difficulty communicating because they did not know what to communicate (that is, if they had difficulty processing the information prior to being required to communicate this information), we would have expected that the lower and middle SES children would have been most diverse in communication of complex materials and that this difference would have become relatively small for simpler material. No such interaction was observed. The instructional and perceptual manipulations

would have also been expected to attenuate the poor performance of lower SES speakers if the speaker's poor performance was due only to information processing difficulties. However, these interactions were not observed.

Factors that did appear related to the communicational advantage found in middle SES children were: 1) Lower SES children tended to be more egocentric than middle SES children (cf. Pozner and Saltz, 1974). This was shown by the fact that lower SES children did not communicate effectively even when they were equated with middle SES children on the amount of relevant and irrelevant information that they put into their messages. Lower SES speakers may have been responded to more poorly because they separated their relevant descriptions with long intervening irrelevant statements, thus making the listeners' information processing task more difficult.

2) Middle SES speakers' descriptions were more redundant. It will be recalled that middle SES speakers also received higher information transmission ratings, and this finding indicates that these speakers were not only more redundant but also that they provided their listeners with more relevant and discriminating information. Redundant (relevant) information may actually help a listener in the selection of the correct stimulus (cf. Bourne and Haygood, 1959).

The integration of these research findings with the current body of experimental literature should allow us to develop a better understanding of SES differences in referential communication.

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Table 1

Table of Means for Number of Correct Listener Selections

Speaker	Instruction	Sex	Type of Matrix			
			Bird		Animal	
			Two Dimensions	Four Dimensions	Two Dimensions	Four Dimensions
Middle	Attention	Male	1.67	1.00	1.67	1.33
		Female	2.00	1.33	1.67	1.00
	Regular	Male	1.00	1.00	2.00	.67
		Female	1.67	1.00	1.67	2.00
Lower	Attention	Male	1.33	.67	1.33	.67
		Female	1.33	.33	1.33	0.00
	Regular	Male	1.67	0.00	1.67	.67
		Female	2.00	.33	.67	.67

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Table 2

Table of Means for Information Transmission Ratings

Speaker	Instruction	Sex	Type of Matrix			
			Bird		Animal	
			Two Dimensions	Four Dimensions	Two Dimensions	Four Dimensions
Middle	Attention	Male	8.00	5.89	8.00	7.55
		Female	8.00	6.88	8.00	5.33
	Regular	Male	7.67	6.22	7.67	6.44
		Female	7.11	6.55	8.00	8.00
Lower	Attention	Male	6.22	6.22	7.33	4.55
		Female	6.77	3.33	5.00	4.00
	Regular	Male	8.00	4.89	7.89	6.00
		Female	6.55	2.33	5.11	5.88

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Table 3

Table of Means for Message Adequacy Scores

Speaker	Instruction	Sex	Type of Matrix			
			Bird		Animal	
			Two Dimensions	Four Dimensions	Two Dimensions	Four Dimensions
Middle	Attention	Male	3.00	1.00	3.00	2.33
		Female	3.00	.67	3.00	2.00
	Regular	Male	2.00	.67	2.33	0.00
		Female	2.67	.67	3.00	3.00
Lower	Attention	Male	1.00	.33	1.67	.33
		Female	1.33	0.00	1.00	.67
	Regular	Male	3.00	1.00	2.67	1.67
		Female	2.00	0.00	.67	.33

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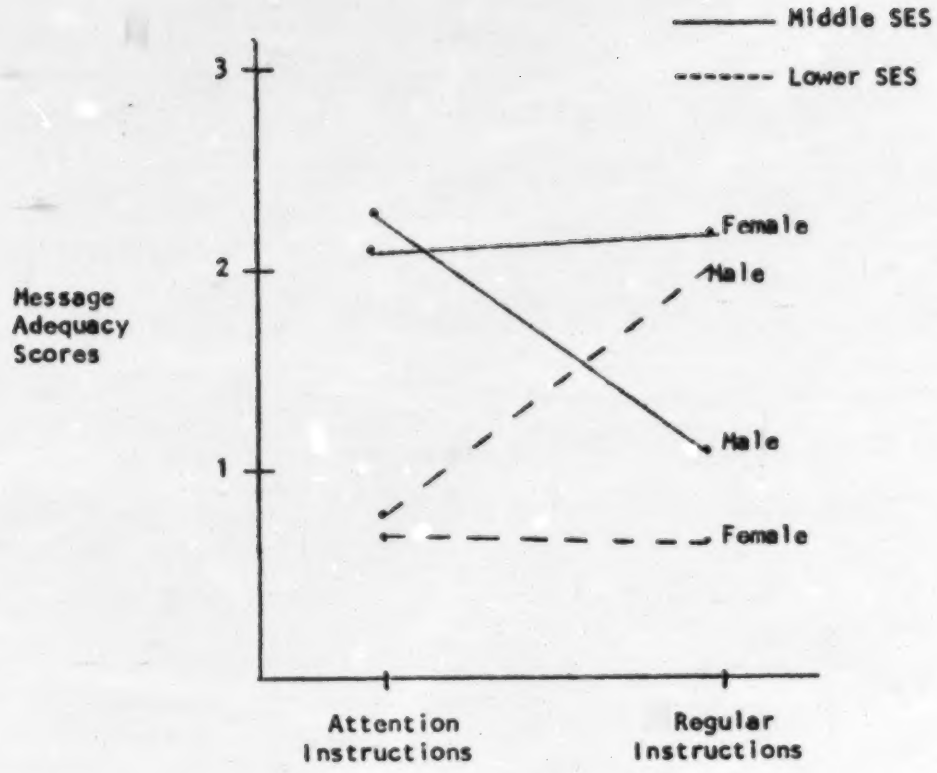

Fig. 1. Relationship of speaker's SES, sex, and instruction condition with message adequacy scores.